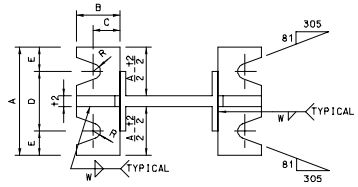
STRUCTUAL STEEL POST FOR GROUND MOUNTED SIGNS												
POST DES. NO.	NOM SIZE	DIA BOLT SIZE AND TORQUE	BASE CONNECTION DATA TABLE (mm)									
			A	B	C	D	E	t1	t2	W	R	
1	W150x13	16 mm ROUND x 70 mm 39 Nm	128	51	32	70	29	19	13	6	9	
2	W150x22		128	51	32	70	29	19	13	6	9	
3	W200x27		128	51	32	70	29	19	13	6	9	
4	W250x33	19 mm ROUND x 90 mm 63 Nm	153	57	35	89	32	25	19	8	10	
5	W250x39		153	57	35	89	32	25	19	8	10	
6	W310x39		153	57	35	89	32	25	19	8	10	

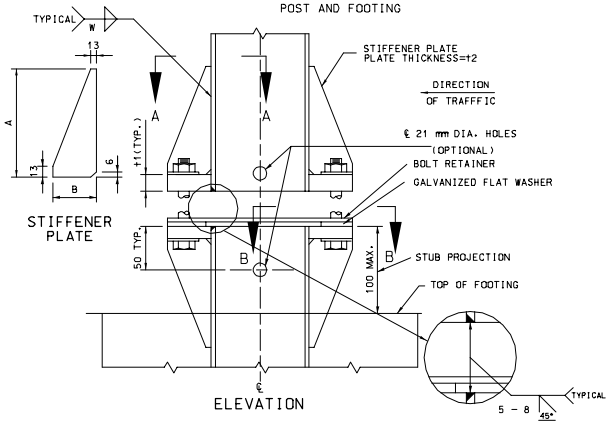
WIDE FLANGE STRUCTURAL STEEL POSTS DESIGN DATA						
POST DES. NO.	NOM. SIZE (mm)	MASS kg/m	DEPTH (mm)	FLANGE		WEB THICK (mm)
				WIDTH (mm)	THICK (mm)	
1	W150	13	150	100	5.5	4.32
2	W150	22	152	152	6.6	5.84
3	W200	27	207	133	8.4	5.84
4	W250	33	258	146	9.1	6.10
5	W250	39	262	147	11.2	6.60
6	W310	39	310	165	9.7	5.84

THE WEIGHT OF STRUCTURAL STEEL POSTS SHOWN IN THE CONTRACT HAS BEEN COMPUTED USING THE WEIGHTS SHOWN.

HINGE PLATE DATA TABLE													
POST DESIGN NO.	F (mm)	G (mm)	H (mm)	J (mm)	K (mm)	L (mm)	M (mm)	N (mm)	d1 (mm)	d2 (mm)	t3 (mm)	BOLT DIA. (mm)	MASS (EA.) (kg)
1	108	25	29	102	57	22	25	13	14	19	5	13	0.34
2	127	32	32	152	89	32	38	19	17	32	6	16	0.76
3	127	32	32	133	70	32	32	19	17	27	6	16	0.68
4	152	38	38	146	70	38	35	21	21	29	8	19	1.14
5	152	38	38	146	70	38	35	21	21	29	8	19	1.14
6	152	38	38	165	89	38	41	21	21	33	8	19	1.27



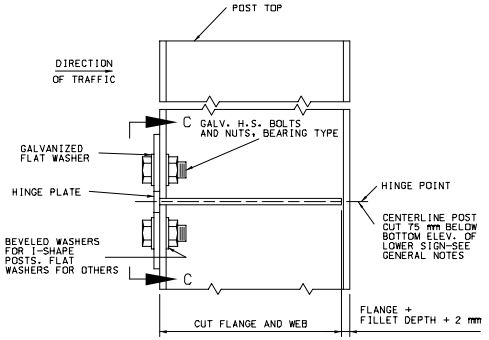
SECTION A-A SECTION B-B



POST AND FOOTING

STIFFENER PLATE

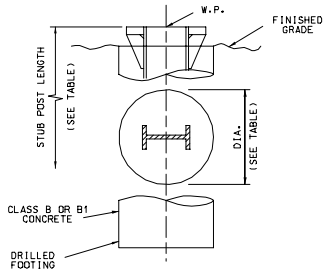
ELEVATION



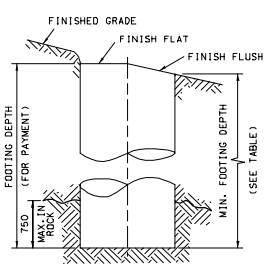
ELEVATION

HINGE PLATE DETAIL

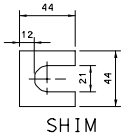
POST AND FOOTING DATA TABLE													
POST				FOOTING									
POST DES. NO.	NOM. SIZE (mm)	MASS kg/m	STUB LGTH (mm)	DIA. (mm)	LEVEL GROUND		1:6 GRADE		1:4 GRADE		1:2 OR 1:3 GRADE	
					DEPTH(m)	m³	DEPTH(m)	m³	DEPTH(m)	m³	DEPTH(m)	m³
1	W150	13	610	380	915	0.11	965	0.12	990	0.13	1065	0.13
2	W150	22	760	610	1220	0.36	1270	0.38	1295	0.39	1370	0.41
3	W200	27	760	710	1370	0.54	1420	0.56	1445	0.57	1525	0.60
4	W250	33	915	915	1525	1.00	1575	1.04	1600	1.06	1675	1.11
5	W250	39	915	915	1525	1.00	1600	1.05	1650	1.09	1755	1.16
6	W310	39	915	915	1675	1.10	1755	1.16	1805	1.19	1905	1.26



FOUNDATION DETAIL



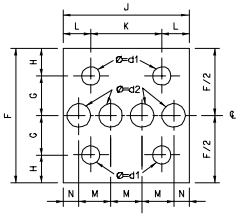
FOOTING



SHIM

SHEET METAL BOLT RETAINER CUT FROM 0.39 mm GALVANIZED SHEET METAL. PLACE BETWEEN BASE PLATES. SIZE VARIES TO FIT PLATE. BOLT HOLES TO BE 2 mm LARGER THAN REQUIRED BOLT SIZE.

BOLT RETAINER



HINGE PLATE THICKNESS=t3

ALL HOLES SHALL BE DRILLED. ALL PLATE CUTS SHALL PREFERABLY BE SAW CUTS. HOWEVER; FLAME CUTTING WILL BE PERMITTED PROVIDED ALL EDGES ARE GROUND.

HINGE PLATE SHALL BE FABRICATED FROM ASTM A 36 STRUCTURAL STEEL.

ELEVATION C-C

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

DESIGN SPECS: AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS - 1985.

POSTS TO BE GALVANIZED AFTER FABRICATION.

METAL PROJECTING BEYOND THE PLANE OF THE PLATE FACE WILL NOT BE ALLOWED.

REMOVE ALL GALVANIZING RUNS OR BEADS IN THE WASHER AREA.

ALL STRUCTURAL STEEL STIFFENER PLATES AND BASE PLATES, FOR GROUND MOUNTED SIGNS SHALL MEET THE REQUIREMENTS OF ASTM A 36 OR AASHTO M223 345 MPa, OR AASHTO 222, MINIMUM YIELD 345 MPa.

IN THE EVENT THE DISTANCE BETWEEN THE TOP OF THE FOOTING AND THE HINGE POINT IS LESS THAN 2.25 m, THE SIGN HEIGHT AND POST LENGTH IS TO BE INCREASED SUFFICIENTLY TO ACCOMMODATE THIS MINIMUM SPACING.

HINGE PLATES NOT REQUIRED ON SINGLE POST SIGNS OR ANY SIGNS USING PIPE POSTS.

"H.S. BOLTS" REFER TO HIGH STRENGTH BOLTS.

NUTS ON HINGE PLATE BOLTS SHALL BE TIGHTENED TO THE REQUIRED MINIMUM BOLT TENSION VALUES SHOWN IN TABLE 1 SEC. 712.10.2 OF THE STANDARD SPECIFICATIONS.

THE NUT SHALL BE FREE RUNNING. IF THE NUT WILL NOT SPIN ON THE BOLT BECAUSE OF GALVANIZING IRREGULARITIES, A LUBRICANT SHALL BE APPLIED.

ALL BREAKAWAY ASSEMBLY BOLTS SHALL BE TIGHTENED IN A SYSTEMATIC MANNER TO THE PRESCRIBED TORQUE SHOWN ON THIS DRAWING.

EACH BREAKAWAY ASSEMBLY BOLT SHALL BE LOOSENED AND RE-TIGHTENED TO THE REQUIRED TORQUE IN THE SAME ORDER AS THE INITIAL TIGHTENING.

THE THREADS SHALL BE BURRED AT THE NUT USING A CENTER PUNCH TO PREVENT NUT FROM LOOSENING.

POST LENGTH QUANTITY SHOWN ON PLANS INCLUDES STUB.

13 mm X 65 mm H.S. BOLTS FOR PIPE POSTS SHALL BE OF THE DESIGNATION AASHTO M164 OR ASTM A449. ALL OTHER H.S. BOLTS SHALL BE OF THE DESIGNATION AASHTO M164.

FURNISH TWO 0.3 mm± AND TWO 0.08 mm± THICK SHIMS PER POST. FROM BRASS SHIM STOCK OR STRIP. DESIGNATION ASTM B36. SHIM AS REQUIRED TO PLUMB POST.

H.S. POSTS WITH HEX NUT AND THREE WASHERS WITH EACH BOLT ARE TO BE GALVANIZED.

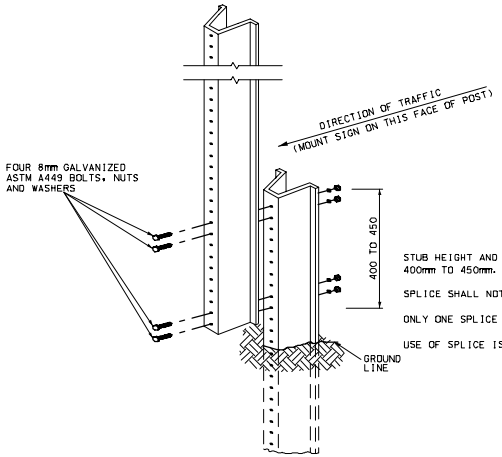
OPTIONAL HOLES (21 mm ROUND FOR "I" SHAPE POSTS AND 14 mm ROUND FOR PIPE POST BASE PLATES) AS SHOWN IN "ELEVATIONS" ARE TO BE USED AS AID FOR GALVANIZING ONLY.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

HIGHWAY SIGNING

BREAKAWAY ASSEMBLIES FOR GROUND MOUNTED SIGNS

DATE:_____ | EFFECTIVE: 01-01-2003 | M903.03AX | 1/7



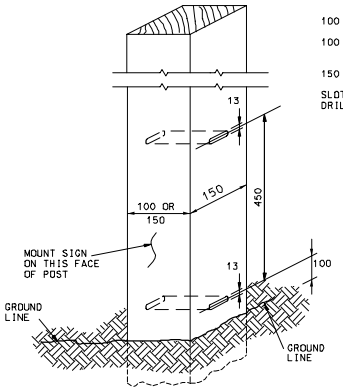
STUB HEIGHT AND SPLICE LAP SHALL BE 400mm TO 450mm.

SPLICE SHALL NOT EXTEND BELOW THE GROUND.

ONLY ONE SPLICE WILL BE ALLOWED PER POST.

USE OF SPLICE IS OPTIONAL.

U-CHANNEL POST DETAIL



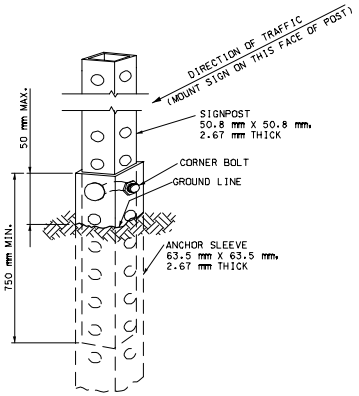
WOOD POST DETAIL

100 mm X 100 mm WOOD POST - NO SLOTS OR HOLE REQUIRED

100 mm X 150 mm WOOD POST - 38 mm X 13 mm SLOT ON 150 mm SIDE OR 38 mm DIA. HOLE ON 150 mm SIDE

150 mm X 150 mm WOOD POST - 50 mm X 13 mm SLOT OR 50 mm DIA. HOLE

SLOT ACROSS NEUTRAL AXIS FORMED BY SUCCESSIVE DRILLING WITH 13 mm BIT.



THE SIGNPOST IS ATTACHED TO THE ANCHOR SLEEVE WITH THE CORNER BOLT PER MANUFACTURER'S SPECIFICATION.

PERFORATED SQUARE STEEL TUBE POST DETAIL

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

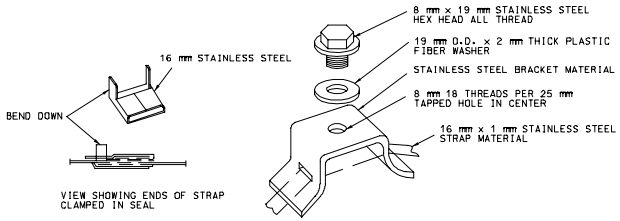
REFER TO STANDARD DRAWING M616.10, SHEET 1 OF 5, FOR NON-PIPE POST MOUNTING OPTIONS.

ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 910 cm.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
	HIGHWAY SIGNING POST MOUNTING DETAILS		
DATE:_____	EFFECTIVE: 01-01-2003	M903.03AX	2/7

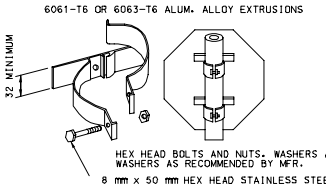
ROUND PIPE POST FOR GROUND MOUNTED SIGNS									
NOMINAL PIPE SIZE (mm)	BOLT DATA			BASE CONNECTION DATA TABLE (mm)					
	SIZE (mm)	LENGTH (IN.)	TORQUE Nm	A	B	C	R	T	W
65 & 75	13	90	15.8	159	229	6	7	25	6
100	16	95	39.0	183	254	6	10	25	8

ROUND PIPE POST AND FOOTING DATA TABLE					
NOM. SIZE (mm)	MASS Kg/m	STUB LENGTH (mm)	FOOTING		CONCRETE (m^3/m)
			DIA. (mm)	DEPTH (mm)	
65	8.62	1005	305	1065	0.073
75	11.28	1310	305	1370	0.073
100	16.06	1615	460	1675	0.166

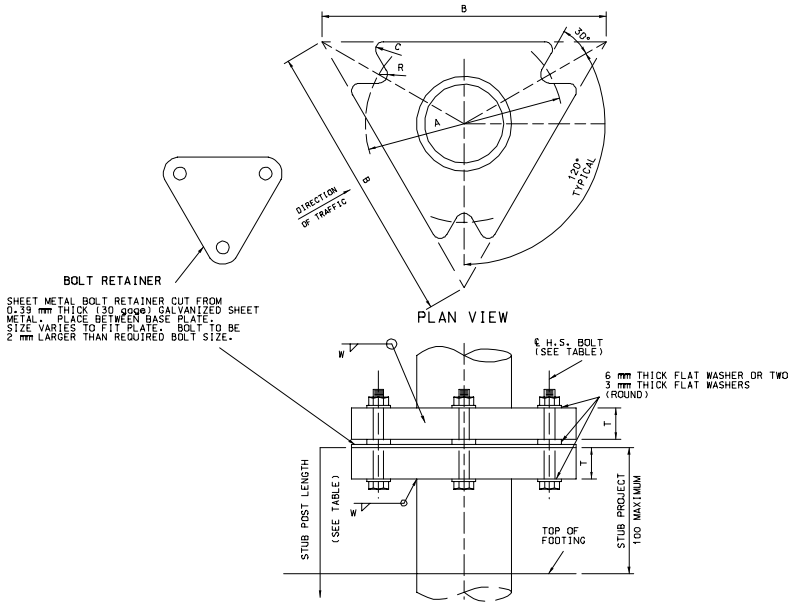


STRAP SEAL

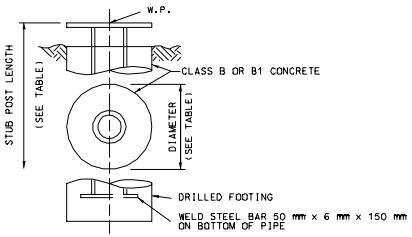
FLARED LEG SIGN BRACKET



CLAMP TYPE SIGN SUPPORTS FOR PIPE POST

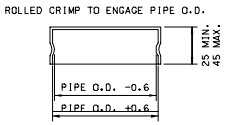


MULTI-DIRECTION SLIP BASE

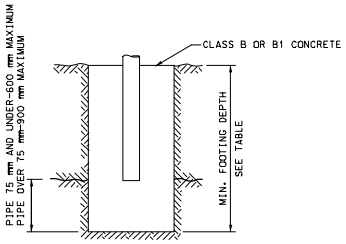


SLIP BASE ASSEMBLIES

FOUNDATION DETAIL



FRICTION CAP



FOOTING IN ROCK

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

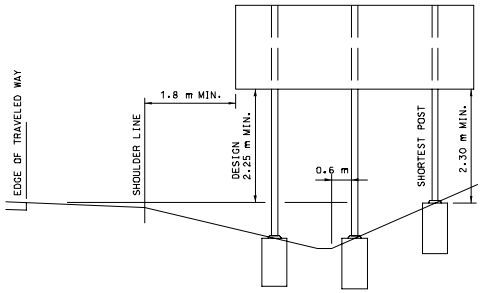
REFER TO STANDARD DRAWING M616.10, SHEET 1 OF 5, FOR NON-PIPE POST MOUNTING OPTIONS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

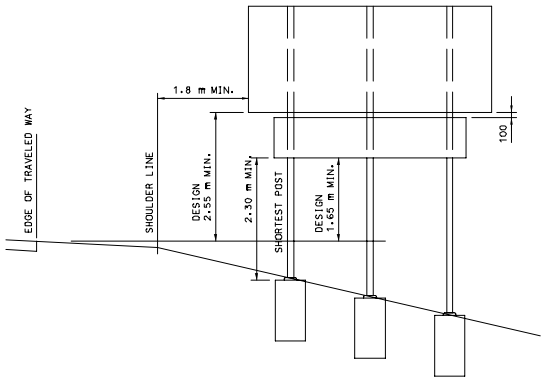
HIGHWAY SIGNING

POSTS FOR SIGNS 2.8 m^2 OR SMALLER

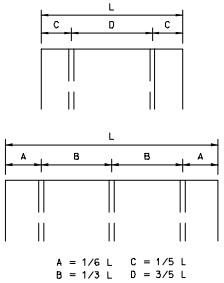
DATE:_____ | EFFECTIVE: 01-01-2003 | M903.03AX | 3/7



DITCH SECTION



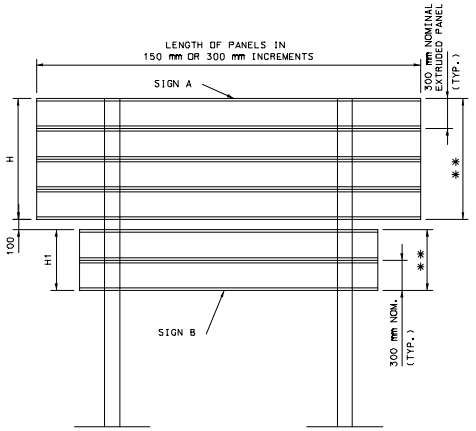
FILL SECTION

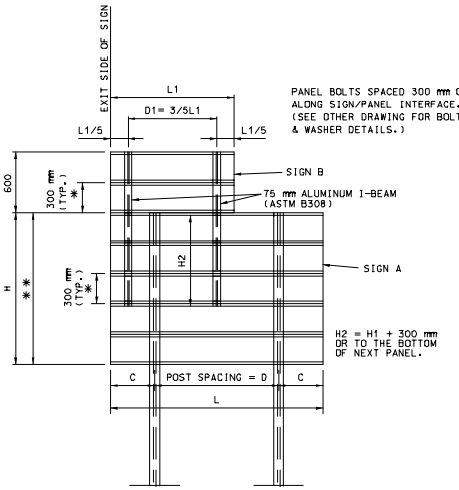


A = 1/6 L C = 1/5 L
B = 1/3 L D = 3/5 L

POST SPACING

FOR L OF 1.8 m TO 5.1 m USE 2 POSTS.
FOR L GREATER THAN 5.1 m USE 3 POSTS.
FOR L LESS THAN 5.1 m, 3 POSTS MAY BE USED DEPENDING ON SOIL CONDITIONS.

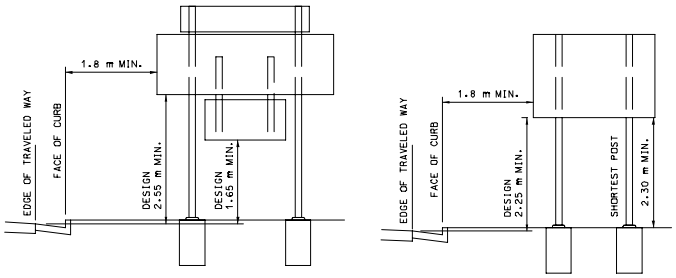




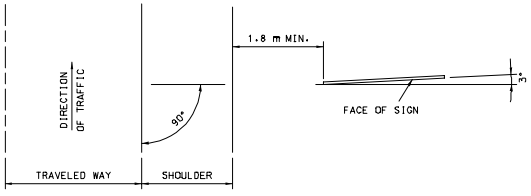
USE THIS DETAIL FOR EXIT NUMBER PANELS MOUNTED ON GUIDE SIGNS.

SIGN B MAY BE MOUNTED ABOVE OR BELOW SIGN A AS REQUIRED.
* EXTRUDED ALUMINUM PANEL. SEE OTHER DRAWINGS.
** VARIABLE NUMBER OF 300 mm EXTRUDED ALUMINUM PANELS.

SIGN AND PANEL SPACING



BARRIER CURB SECTIONS



LOCATION SKETCH

GENERAL NOTES:

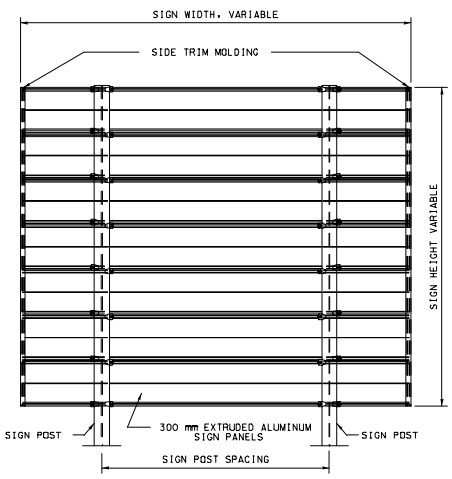
ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

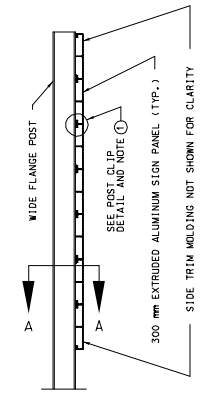
HIGHWAY SIGNING

TYPICAL SECTION AND POST SPACING

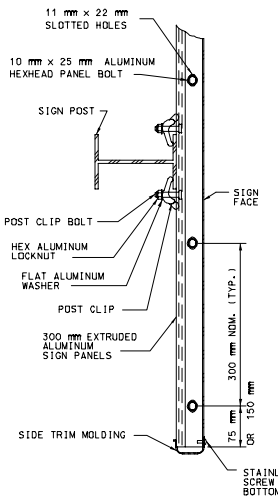
DATE:_____ | EFFECTIVE: 01-01-2003 | M903.03AX | 4/7



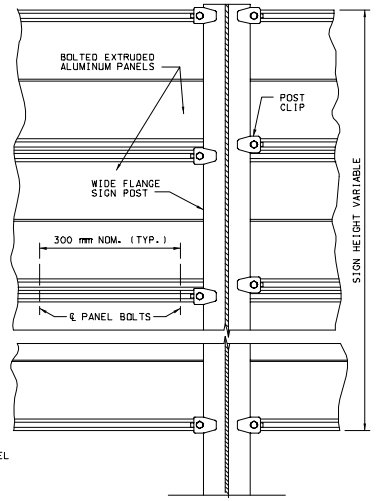
SIGN PANEL ASSEMBLIES



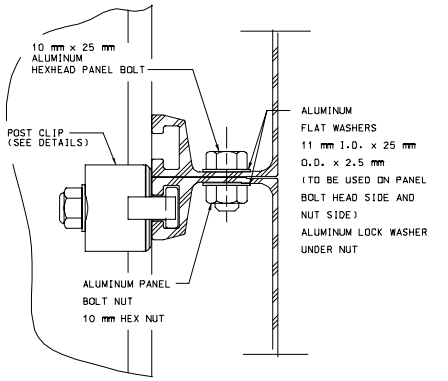
END ELEVATION



SECTION A-A



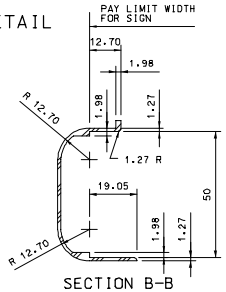
TYPICAL MOUNTING DETAILS
EXTRUDED PANELS



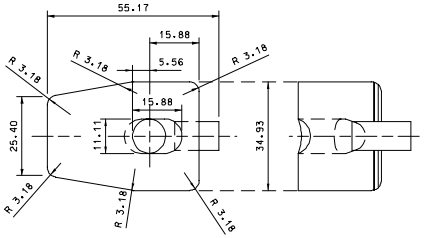
POST CLIP DETAIL

NOTE (1) SIGNS SHALL BE FIELD ATTACHED TO POSTS WITH POST CLIPS AND BOLTS. SEE POST CLIP DETAIL. THE SHANK OF THE POST CLIP BOLT SHALL FIT TIGHTLY AGAINST THE POST FLANGE AFTER THE LOCKNUTS ARE TORQUED. LOCKNUTS ON THE POST CLIP BOLTS SHALL BE TORQUED TO 25.4 Nm WHEN USING DRY, CLEAN, UNLUBRICATED THREADS.

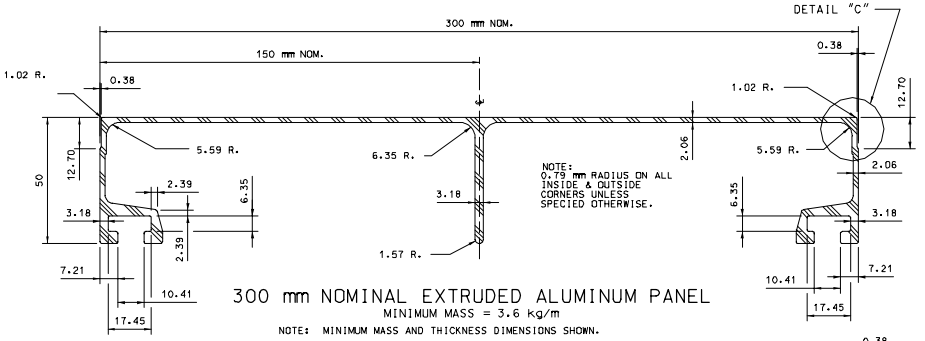
NOTE: FOR SIGNS FABRICATED AND SHIPPED IN 2 OR MORE SECTIONS. EACH SECTION WILL HAVE STAINLESS STEEL SCREWS IN TOP AND BOTTOM SECTIONS



SECTION B-B



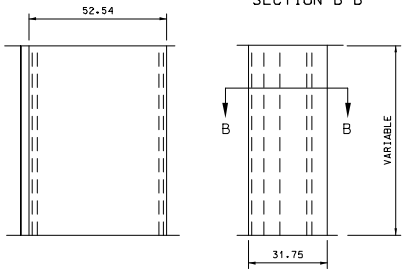
PLAN VIEW END VIEW



300 mm NOMINAL EXTRUDED ALUMINUM PANEL

MINIMUM MASS = 3.6 kg/m

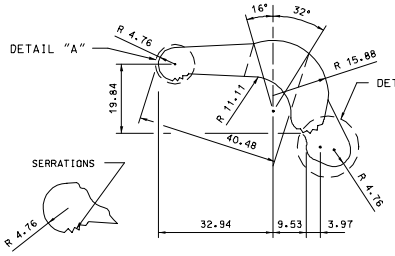
NOTE: MINIMUM MASS AND THICKNESS DIMENSIONS SHOWN. HEAVIER PANELS MAY BE USED.



ELEVATION FRONT VIEW

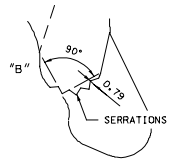
SIDE TRIM MOLDING

(0.41 kg/m)

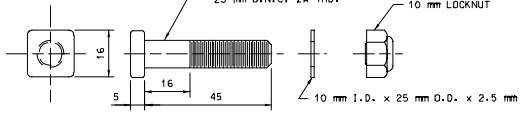


DETAIL "A"
ENLARGED VIEW OF SERRATIONS

ELEVATION VIEW
POST CLIP



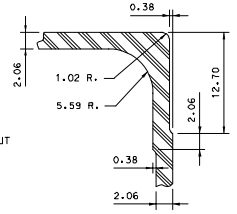
DETAIL "B"
ENLARGED DETAIL OF SERRATIONS
SAW GATING AS SHOWN (APPROXIMATELY FLAT PERMISSABLE)



POST CLIP BOLT WITH FLAT WASHER AND LOCKNUT

NOTE: SQUARE BOLT HEAD SHOWN. RECTANGULAR BOLT HEAD WITH LEAST DIMENSION OF 16 mm MAY BE USED.

BOLT - 45mm x 10 mm ALUMINUM
HEX LOCKNUT - 10 mm ALUMINUM
WASHER - ALUMINUM



DETAIL "C"

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

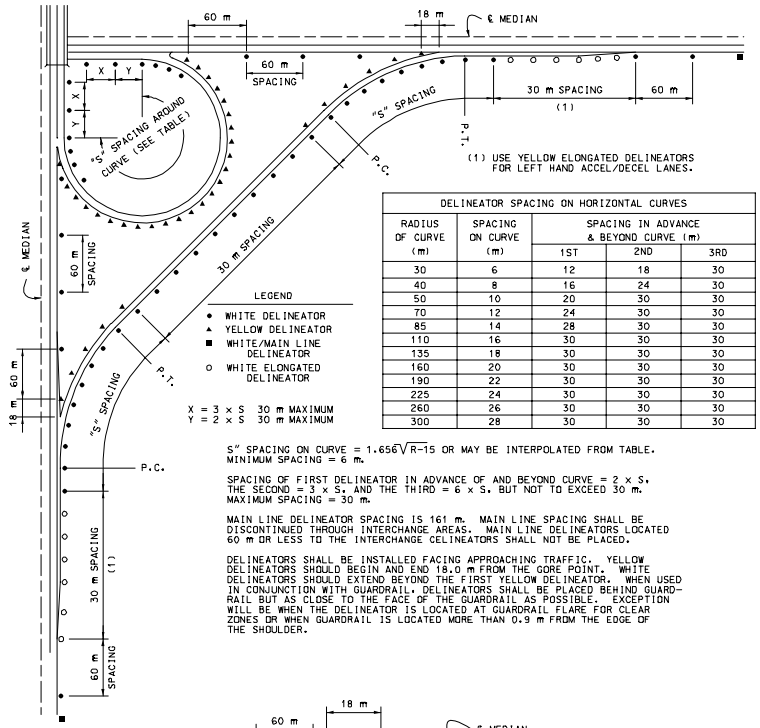
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

HIGHWAY SIGNING

EXTRUDED ALUMINUM PANEL

DETAILS

DATE:_____ | EFFECTIVE: 01-01-2003 | M903.03AX | 5/7



(1) USE YELLOW ELONGATED DELINEATORS FOR LEFT HAND ACCEL/DECEL LANES.

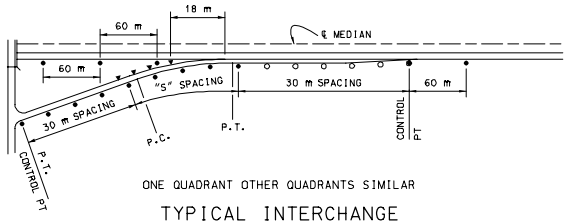
DELINEATOR SPACING ON HORIZONTAL CURVES				
RADIUS OF CURVE (m)	SPACING ON CURVE (m)	SPACING IN ADVANCE & BEYOND CURVE (m)		
		1ST	2ND	3RD
30	6	12	18	30
40	8	16	24	30
50	10	20	30	30
70	12	24	30	30
85	14	28	30	30
110	16	30	30	30
135	18	30	30	30
160	20	30	30	30
190	22	30	30	30
225	24	30	30	30
260	26	30	30	30
300	28	30	30	30

"S" SPACING ON CURVE = $1.65\sqrt{R-15}$ OR MAY BE INTERPOLATED FROM TABLE. MINIMUM SPACING = 6 m.

SPACING OF FIRST DELINEATOR IN ADVANCE OF AND BEYOND CURVE = 2 × S, THE SECOND = 3 × S, AND THE THIRD = 6 × S, BUT NOT TO EXCEED 30 m. MAXIMUM SPACING = 30 m.

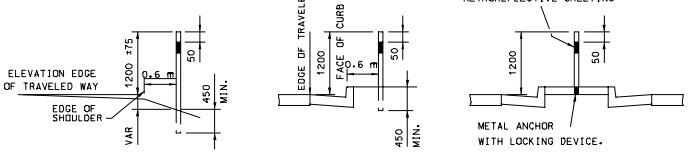
MAIN LINE DELINEATOR SPACING IS 161 m. MAIN LINE SPACING SHALL BE DISCONTINUED THROUGH INTERCHANGE AREAS. MAIN LINE DELINEATORS LOCATED 60 m OR LESS TO THE INTERCHANGE CELINEATORS SHALL NOT BE PLACED.

DELINEATORS SHALL BE INSTALLED FACING APPROACHING TRAFFIC. YELLOW DELINEATORS SHOULD BEGIN AND END 18.0 m FROM THE CORE POINT. WHITE DELINEATORS SHOULD EXTEND BEYOND THE FIRST YELLOW DELINEATOR. WHEN USED IN CONJUNCTION WITH GUARDRAIL, DELINEATORS SHALL BE PLACED BEHIND GUARD-RAIL BUT AS CLOSE TO THE FACE OF THE GUARDRAIL AS POSSIBLE. EXCEPTION WILL BE WHEN THE DELINEATOR IS LOCATED AT GUARDRAIL FLARE FOR CLEAR ZONES OR WHEN GUARDRAIL IS LOCATED MORE THAN 0.9 m FROM THE EDGE OF THE SHOULDER.



ONE QUADRANT OTHER QUADRANTS SIMILAR

TYPICAL INTERCHANGE

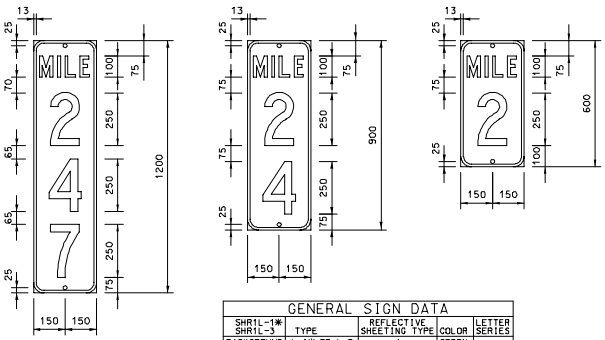


TYPE 1 POST
SHOULDER MOUNTED

TYPE 1 POST
OUTSIDE BARRIER CURB

TYPE 1 POST
NARROW PAVED MEDIAN

FLEXIBLE DELINEATOR MOUNTING

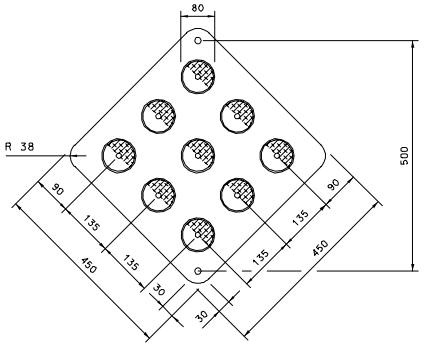


RADII SHALL BE 50 mm. SHEET ALUMINUM SHALL BE 2.0 mm THICK WITH TWO – 10 mm DIAMETER HOLES EACH.

GENERAL SIGN DATA				
SHR1L-1✱ SHR1L-3	TYPE	REFLECTIVE SHEETING TYPE	COLOR	LETTER SERIES
BACKGROUND	L-1✱ OR L-3	1	GREEN	
LEGEND	L-1✱ OR L-3	1	WHITE	C
SYMBOLS				
BORDER	L-1✱ OR L-3	1	WHITE	
SUBSTRATE	SHEET			

✱ REVERSE SCREENED

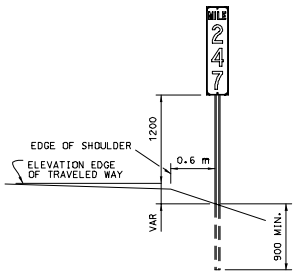
SIGN DETAILS



NOTE:

RED TYPE 2 REFLECTIVE SHEETING WITH RED REFLECTORS ON 1.5 mm THICK SHEET ALUMINUM WITH TWO 10 mm DIAMETER HOLES EACH.

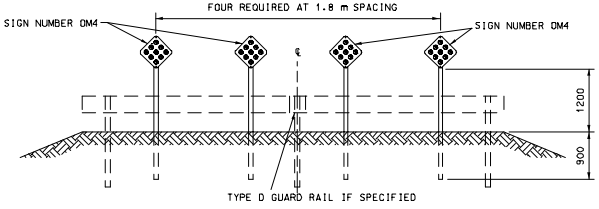
SIGN DETAILS



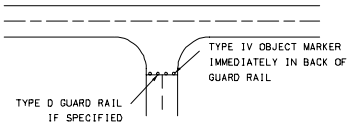
SHOULDER MOUNTED

OUTSIDE BARRIER CURB

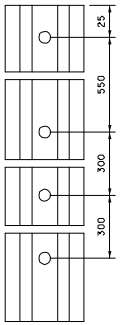
MOUNTING DETAIL
MILE MARKER



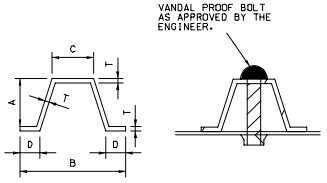
MOUNTING DETAILS
TYPE IV OBJECT MARKER
SIGN OM4



TYPICAL ROAD CLOSED



HOLE PUNCHING SHOWN IS THE MINIMUM NUMBER AND SPACING ALLOWED. THE MAXIMUM HOLE PUNCHING ALLOWED IS 10 mm DIAMETER HOLES, 25 mm CENTER TO CENTER, BEGINNING 25 mm FROM THE END AND CONTINUING THE ENTIRE LENGTH OF THE POST.



STEEL MILE & OBJECT MARKER POST						
LIMITS	✱ kg/m	DIMENSIONS – mm				
		A	B	C	D	T
MIN.	2.68	32	64	25	12	2.8
MAX.	3.35	41	83	32	18	4.4

✱ MASS BEFORE GALVANIZING OR PUNCHING. LIMITS SHOWN ARE ABSOLUTE. NO FURTHER WEIGHT, DIMENSIONAL OR COMMERCIAL TOLERANCE WILL BE ACCEPTABLE.

MILE AND OBJECT MARKER POST AND FASTENER DETAILS

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

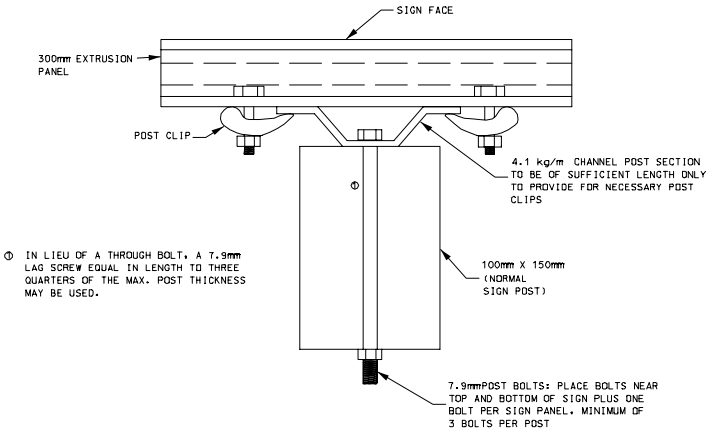
THE CONTRACT UNIT PRICE FOR EACH MILE MARKER AND TYPE IV OBJECT MARKER SHALL INCLUDE SIGN PANEL, REFLECTIVE SHEETING, REFLECTORS, AS DESIGNATED, AND POST, REGARDLESS OF LENGTH.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

HIGHWAY SIGNING

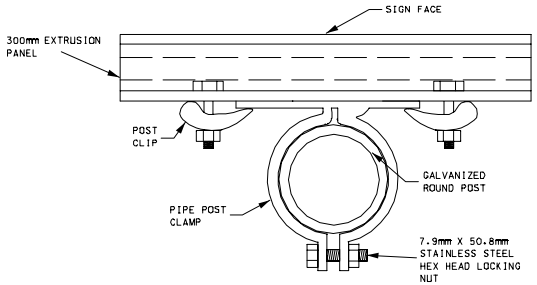
DELINEATORS, MILE MARKERS AND OBJECT MARKERS

DATE:_____ | EFFECTIVE: 01-01-2003 | M903.03AX | 6/7



PLAN VIEW

MOUNTING DETAILS FOR EXTRUDED PANELS ON WOOD 100mm X 150mm POST

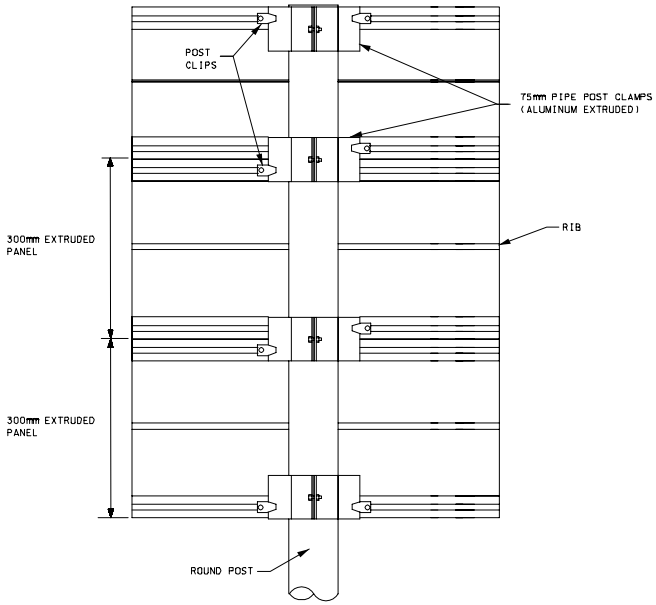


PLAN VIEW

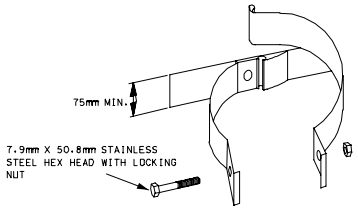
MOUNTING DETAILS FOR EXTRUDED PANELS ON ROUND PIPE POST

NUMBER OF BOLTS TO ATTACH STEEL CHANNEL TO WOOD POST	
SIGN HEIGHT (mm)	NO. OF BOLTS* PER WOOD POST USED
300	2
600	3
900	4
1200	5
1500	6
1800	7
2100	8

*LAG SCREWS MAY BE SUBSTITUTED



MOUNTING TO ROUND PIPE POSTS FOR GROUND MOUNTED SIGNS



CLAMP TYPE SIGN SUPPORT FOR PIPE POST

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

HIGHWAY SIGNING

EXTRUDED PANEL ATTACHMENTS FOR SIGNS 2.8 m^2 OR SMALLER

DATE:_____ | EFFECTIVE: 01-01-2003 | M903.03AX | 7/7